

## A comparative study of simple methods to quantify cerebral blood flow with acetazolamide challenge by using iodine-123-IMP SPECT with one-point arterial sampling

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The aim of this study was to compare the accuracy of simplified methods for quantifying rCBF with acetazolamide challenge by using  $^{123}\text{I}$ -N-isopropyl-p-iodoamphetamine (IMP) and SPECT with one-point arterial sampling. After acetazolamide administration we quantified rCBF in 12 subjects by the following three methods: (a) the modified microsphere method, (b) the IMP-autoradiographic (ARG) method based on a two-compartment one-parameter model, and (c) the simplified method based on a two-compartment two-parameter model (functional IMP method). The accuracy of these methods was validated by comparing rCBF values with those obtained by the standard method: the super-early microsphere method with continuous withdrawal of arterial blood. On analyzing rCBF in each flow range (0–0.25, 0.25–0.5, 0.5–0.75 and more than 0.75 ml/g/min), rCBF values obtained by both methods (a) and (c) showed significant correlations ( $p < 0.01$ ) with those obtained by the standard method in every range, but rCBF values obtained by method (b) did not significantly correlated in the high flow range (0.5–0.75 and more than 0.75 ml/g/min). Method (c) was found to be the most accurate, even though it needs two serial SPECT scans. When requiring one SPECT scan, method (a) was considered to be superior to method (b) because of its accuracy, especially in high flow regions loaded with acetazolamide.

**Key words:** iodine-123-IMP, regional cerebral blood flow, SPECT, acetazolamide, compartment analysis